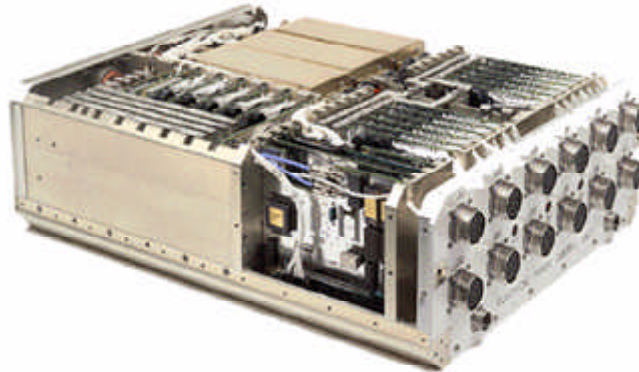


Advanced Electric Distribution, Switching, and Conversion Technology for Power Control



Engineering model of Electrical Power Control Unit. (Copyright Sundstrand Aerospace; used with permission.)

The Electrical Power Control Unit currently under development by Sundstrand Aerospace for use on the Fluids Combustion Facility of the International Space Station is the precursor of modular power distribution and conversion concepts for future spacecraft and aircraft applications. This unit combines modular current-limiting flexible remote power controllers and paralleled power converters into one package.

Each unit includes three 1-kW, current-limiting power converter modules designed for a variable-ratio load sharing capability. The flexible remote power controllers can be used in parallel to match load requirements and can be programmed for an initial ON or OFF state on powerup. The unit contains an integral cold plate.

The modularity and hybridization of the Electrical Power Control Unit sets the course for future spacecraft electrical power systems, both large and small. In such systems, the basic hybridized converter and flexible remote power controller building blocks could be configured to match power distribution and conversion capabilities to load requirements. In addition, the flexible remote power controllers could be configured in assemblies to feed multiple individual loads and could be used in parallel to meet the specific current requirements of each of those loads.

FLEXIBLE REMOTE POWER CONTROLLER SPECIFICATIONS
Voltage rating, Vdc . . . 120/28
Current rating, A 4

CONVERTER SPECIFICATIONS
Nominal input voltage, Vdc 120
Nominal output voltage, Vdc 28
Total converter output rating, kW . . 3

Ultimately, the Electrical Power Control Unit design concept could evolve to a common switch module hybrid, or family of hybrids, for both converter and switchgear applications. By assembling hybrids of a common current rating and voltage class in parallel, researchers could readily adapt these units for multiple applications.

The Electrical Power Control Unit concept has the potential to be scaled to larger and smaller ratings for both small and large spacecraft and for aircraft where high-power-density, remote power controllers or power converters are required and a common replacement part is desired for multiples of a base current rating.

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